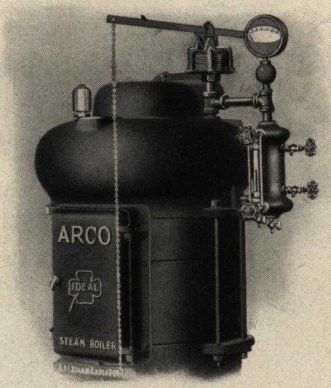
Ideal Boilers

AMERICAN RADIATOR COMPANY

IDEAL Boilers



Arco pattern for warming homes schools, stores, churches, etc., by steam or water—hard or soft coal.

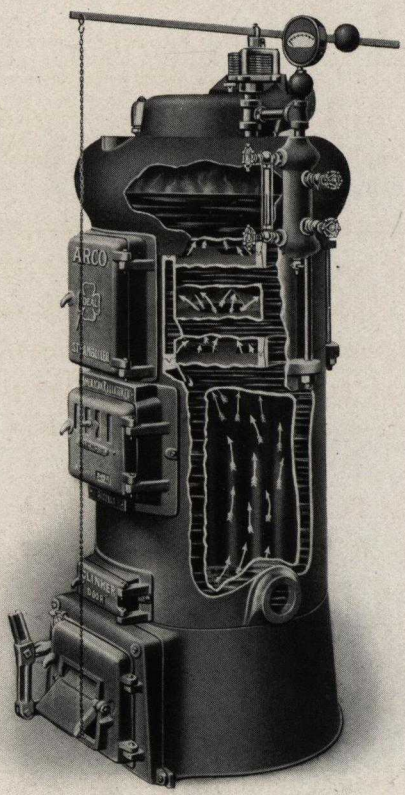
FROM

J. OSCAR SMITH.

IDEAL HEATING SYSTEMS,

[illegible]ERLY, MO.

Ideal Arco Steam Boilers



Showing deep Fire-pot and Circulation, Steam Dome, etc.

The front draft doors on the ash pits are hinged in the center and balance on the butterfly pattern, as shown above. This makes a sensitive and easy regulation of inlet draft to the grate.

Practical Boiler Values

The right measure of a good heating boiler is combined in these points: One which will run the easiest, with least coal, furnish plenty of heat to the radiators in the rooms, go through every winter without repairs and come out "as good as new" in the Spring.

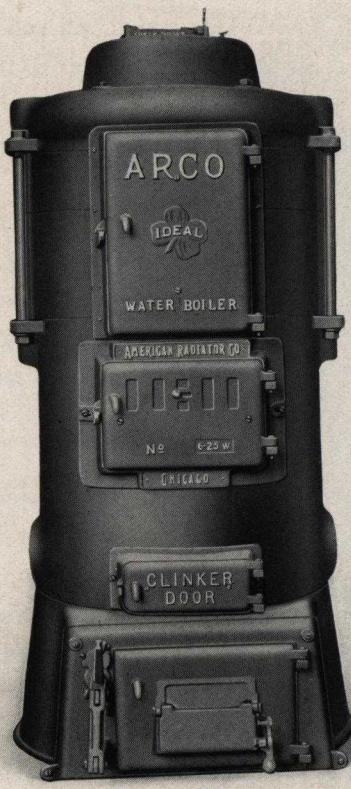
What the house-owner rightly expects is good heating results, no coal wastes, easy caretaking, no repair bills. When a heating boiler will accomplish such results with fairly sensible management, good average fuel and chimney draft—it fulfills its objects, and satisfaction continues, winter in and out.

IDEAL Boilers give this kind of satisfaction. The reasons are simple; they are convincing as theories, and easy to prove. Their increasing popularity and sale arise from their reliable heating efficiency, fuel economy and long durability in thousands of homes and other buildings throughout the country.

These Boilers are made specially to meet the heating needs of cottages, residences, stores, hotels and other moderate size buildings.

Our statements rest on preliminary tests of ideas partly worked out, tests in process of manufacture, complete factory tests and, finally, practical proofs from operation in buildings.

Ideal Arco Water Boilers



No. 6-25-W Water Boiler

The sections are nearly self-cleaning. But for some low-grade fuels the necessary cleaning can be done in a few minutes though the extra large clean-out door and feed door in front.

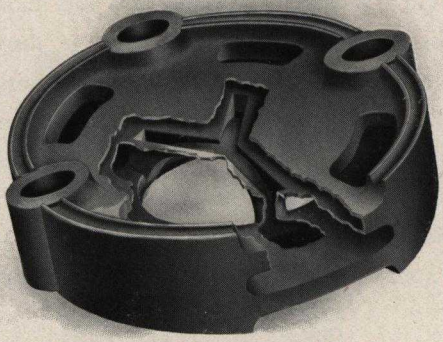
Correct Proportions

These Boilers are especially valued for the heat that they make; therefore, in their design and manufacture, everything revolves around this prime requirement. They are correct in all proportions, compact and simple, taking up least cellar space, and are most easy to set up. The concentration of fire surfaces is a strong feature which produces the best heating results from least fuel burning and most simple caretaking, Special pains being taken to afford easy regulation.

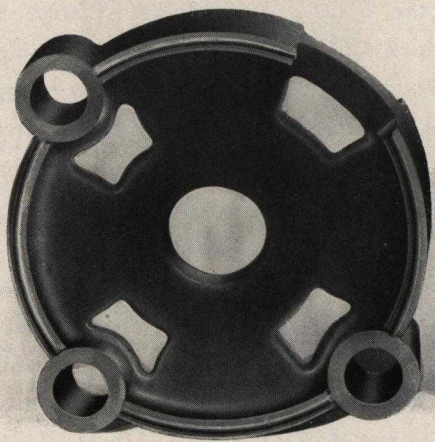
These welcome features in Boiler operation are insured to the house-owner by the correct working features which underlie this condensed make-up. The high efficiency of our IDEAL Boilers is brought out by skillful proportioning of the grate, extent and position of heating surfaces, travel of the heated gases and smoke, the water circulation, steam space, water or steam outlets, fuel capacity, and air draft supply. If these features are not in right proportion to one another, there is a lack of heat for the radiators, and too much coal is burned. Consequently sensible proportioning between the heat-making parts is a prominent trait in the manufacture of IDEAL Boilers.

Amount of heat obtainable from a pound of coal is as fixed as number of cents in a dollar; so, IDEAL Boilers are made to get the maximum heat the coal is capable of yielding.

Single and Double Sections



Double Section of Boiler—sectional view



Single Intermediate Section—top view

The heating surface of the sections of IDEAL Boilers is increased by staggering passageways for flames, gases and smoke, between and up through them—means more heat at radiators.

The Heating Surfaces

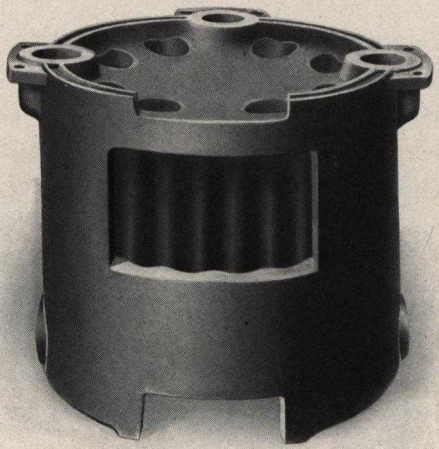
The amount and position of the heating surfaces, which take the heat from the burning coal and hot gases and pass it into the water within the Boiler sections, are important features. On them largely depend the degree of comfort in the rooms above and the amount of fuel burned in the cellar below.

A square foot of heating surface exposed to heat rays and hot gases has no more power to pass heat to water now than it had a century ago. But the position and way in which that surface may be arranged will quadruple its heat transmitting power.

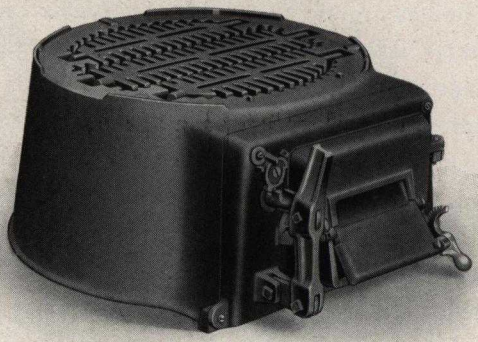
Some Boilers are offered having rated capacities based on a large area of heating surface; others, based on grate surface alone. But either of these methods is misleading. The statements made as to how much surface can be heated in the radiators in connection with our IDEAL Boilers are based on the apt position of their fire surfaces as a leading feature in heat making. They are arranged to receive the largest volume of heat while the ample fire-chamber and air-mixing features freely burn the gases as fast as liberated instead of losing the gases up the chimney.

High capacities to evaporate the most water from a pound of coal in IDEAL Steam Boilers, and to rapidly circulate it in Water Boilers, are the practical bases of their large heating power.

Large Fire Chamber and Ash Pit



Chamber and Fuel-Pot of Boiler



New Arco Base Complete

Inside fire-pot corrugations present 30 per cent more surface to the intense heat than if the surface were made plain. The channels insure right air supply at edges of fire, making sharp combustion.

Rapid Circulation

To obtain plenty of heat from the radiators in the rooms the Boiler must afford easy and rapid circulation in volumes of water thinly distributed at the side of and over the fire. A sluggish circulation of thick water volumes with much friction (either in a steam or water boiler) will prevent the good results which other features well arranged are capable of producing.

In IDEAL Arco Steam Boilers the circulation of the boiling water is well established by three water columns, two for upward circulation on the sides and one for downward currents on the rear. This means rapid release of vapor at the water line and a continuously ample supply of heat for the radiators.

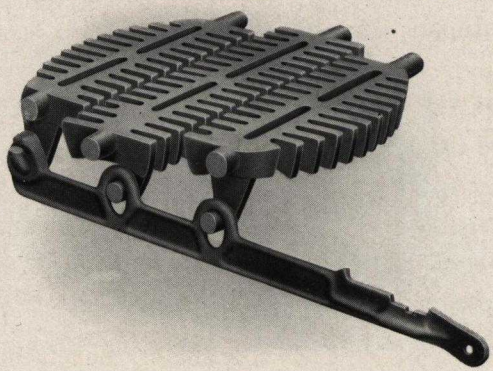
In IDEAL Water Boilers the water is quickly sent upward through the hollow pot and through the superheating sections above, in thin volumes. As the surfaces are sensitive, the rapid passing of the water through the fire parts insures just the degree of heat from the radiators which any condition of weather demands. Every factor for producing quick circulation is carefully studied, tested, and worked out.

The sectional water-way parts are joined by tapered cast-iron push nipples, machine turned. Joint is absolutely tight, iron to iron, always water-tight, yet easy to disconnect if necessary.

Boiler Grates and Air Inlets

IDEAL Boiler grates admit the right amount of air to promote combustion under average conditions of chimney draft. If the openings are too large, too much air enters the fuel chamber and the gases freed by the fire are cooled to the extent of not burning; then the heating value of the coal is wasted. If these spaces are too small, the fire is choked "for want of breath," and fails to produce sufficient heat.

So, in IDEAL Boilers the air entrance through the grates is proportioned to the needs of active, sharp combustion, for a proportionate amount of heating surface and flue travel. This means fuel economy, quick and ample heat for the radiators above.



Grates Assembled Showing Connecting Bar in Place.

The gauges, safety valve, cocks for IDEAL Steam Boilers are of improved design. A set of fire tools, composed of one hoe, poker and scraper, is supplied with both Steam and Water Boilers.

Sure Boiler Ratings

The rating of each IDEAL Boiler tells how many square feet of radiation it will fully supply for room warming from a full charge of coal to the fire-pot every *eight hours*, in zero weather. 80% of each charge is burned for heat-making in the eight hours, while 20% remains to ignite the next charge of fuel.

Rear Grate Bar, Showing Strong Trussed Construction

Of course, all the heat necessary may be obtained in moderate weather with far less coal; the ratings, however, are based on conditions which insure *full* heating effects in extreme weather, from least fuel.

Some boilers in zero weather will only supply heat from one full charge of coal to the full amounts of radiation stated as their capacities, for five or six hours—because their fire-pots do not hold sufficient coal. Fuel is thus wasted in often refeeding. Hence, the 8-hour rating feature of IDEAL Boilers insures reliable heating with savings of coal and care-taking.

Deep fire-pots make holding space for ample fuel storage for all-night heating, and insure enough reserve for early comfort in the morning. This means quickly warming up the house.

Data, Ratings and Price List

No. 4-25-S Boiler

No. 5-19-S Boiler

Steam Boilers

No.	Height (to top outlet) Inches	Nom. Diam. Grate Inches	Grate Area Square Feet	Height Water Line Inches	Outlets No. and Size	Inlets No. and Size	8 Hr. Ratings Sq. Ft.	List Price Complete
4-19-S	52½	19	1.76	45½	1-2½	2-2½	300	$149.50
5-19-S	57	19	1.76	50	1-2½	2-2½	350	167.00
6-19-S	61⅝	19	1.76	54⅝	1-2½	2-2½	400	193.00
4-20-S	51½	20	2.23	46⅛	1-3	2-3	375	180.00
5-20-S	56⅛	20	2.23	50¾	1-3	2-3	425	199.50
6-20-S	60⅝	20	2.23	55¼	1-3	2-3	475	213.00
4-22-S	54	22	2.40	47	1-3	2-3	450	206.50
5-22-S	58½	22	2.40	51½	1-3	2-3	525	226.00
6-22-S	63¼	22	2.40	56¼	1-3	2-3	575	240.00
4-23-S	52¾	23	2.91	46⅝	1-3	2-3	500	219 50
5-23-S	57½	23	2.91	51⅝	1-3	2-3	575	240.00
6-23-S	62¼	23	2.91	56⅛	1-3	2-3	650	287.50
4-25-S	55⅝	25	3.14	47⅞	1-3½	2-3½	550	233.00
5-25-S	60¼	25	3.14	52½	1-3½	2-3½	625	277.50
6-25-S	65⅝	25	3.14	57⅝	1-3½	2-3½	700	300.00
4-28-S	57⅝	28	4.12	49¼	1-4	2-4	800	331.00
5-28-S	62⅝	28	4.12	54¼	1-4	2-4	900	360.50
6-28-S	67⅞	28	4.12	59½	1-4	2-4	1000	389.50
4-31-S	59¾	31	4.90	51	1-4	2-4	1100	419.00
5-31-S	65	31	4.90	56¼	1-4	2-4	1275	470.00
6-31-S	70¾	31	4.90	61⅝	1-4	2-4	1400	500.00
4-34-S	61½	34	5.94	52	1-5	2-5	1300	477.00
5-34-S	67	34	5.94	57½	1-5	2-5	1500	530.00
6-34-S	72⅝	34	5.94	63⅛	1-5	2-5	1650	575.00

For Fuels and Ratings, see page 16. For additional measurements, page 14.

Data, Ratings and Price List

No. 4-28-W Boiler

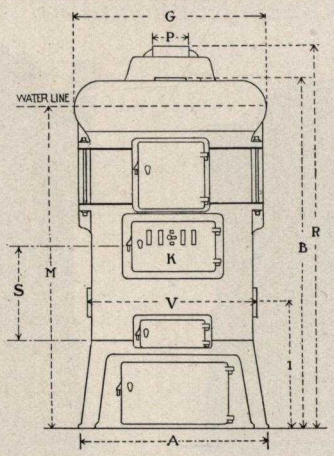
No. 5-20-W Boiler

Water Boilers

No.	Height (to top outlet) Inches	Nom. Diam. Grate Inches	Grate Area Square Feet	Outlets No. and Size	Inlets No. and Size	8 Hr. Ratings Sq. Ft.	List Price Complete
4-19-W	45 7/8	19	1.76	2-2½	2-2½	500	$140.50
5-19-W	50 3/8	19	1.76	2-2½	2-2½	575	158.00
6-19-W	55	19	1.76	2-2½	2-2½	650	184.50
4-20-W	45 1/2	20	2.23	2-3	2-3	625	171.00
5-20-W	50 1/8	20	2.23	2-3	2-3	700	191.00
6-20-W	54 3/4	20	2.23	2-3	2-3	775	204.00
4-22-W	47 5/8	22	2.40	2-3	2-3	750	197.00
5-22-W	52	22	2.40	2-3	2-3	875	217.50
6-22-W	56 7/8	22	2.40	2-3	2-3	950	230.00
4-23-W	46 3/8	23	2.91	2-3	2-3	825	210.50
5-23-W	51 1/8	23	2.91	2-3	2-3	950	230.00
6-23-W	55 7/8	23	2.91	2-3	2-3	1075	277.50
4-25-W	48 3/4	25	3.14	2-3½	2-3½	900	224.00
5-25-W	53 1/2	25	3.14	2-3½	2-3½	1025	270.00
6-25-W	58 5/8	25	3.14	2-3½	2-3½	1150	290.00
4-28-W	50 3/4	28	4.12	2-4	2-4	1325	321.50
5-28-W	55 3/4	28	4.12	2-4	2-4	1500	350.50
6-28-W	60 7/8	28	4.12	2-4	2-4	1650	380.00
4-31-W	53 1/8	31	4.90	2-4	2-4	1825	409.00
5-31-W	58 1/4	31	4.90	2-4	2-4	2100	457.50
6-31-W	63 3/4	31	4.90	2-4	2-4	2325	495.00
4-34-W	54 1/4	34	5.94	2-5	2-5	2150	467.50
5-34-W	59 5/8	34	5.94	2-5	2-5	2475	525.00
6-34-W	65 1/4	34	5.94	2-5	2-5	2725	565.00

For Fuels and Ratings, see page 16. For additional measurements, page 15.

Steam Boiler Measurements

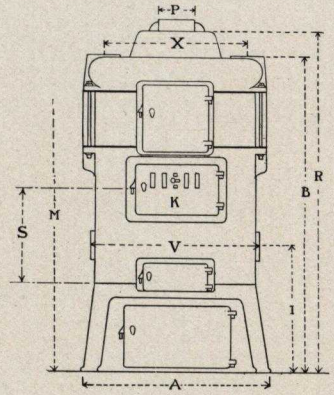


Measurements are in Inches

	G	B	I	K	M	P	R	S	V
4-19-S	26 5/8	52 1/2	14 3/4	8 1/2 x 11 3/4	45 1/2	8	59 5/8	15 7/8	24 1/8
5-19-S	26 5/8	57	14 3/4	8 1/2 x 11 3/4	50	8	64 1/8	15 7/8	24 1/8
6-19-S	26 5/8	61 5/8	14 3/4	8 1/2 x 11 3/4	54 5/8	8	68 3/4	15 7/8	24 1/8
4-20-S	28	51 1/2	16	11 1/16 x 7 27/32	46 1/8	8	58 1/4	16	25 1/2
5-20-S	28	56 1/8	16	11 1/16 x 7 27/32	50 3/4	8	62 7/8	16	25 1/2
6-20-S	28	60 11/16	16	11 1/16 x 7 27/32	55 5/16	8	67 1/16	16	25 1/2
4-22-S	30 1/4	54	15 3/4	9 x 13 1/4	47	9	62 1/4	16 3/4	27 17/32
5-22-S	30 1/4	58 1/2	15 3/4	9 x 13 1/4	51 1/2	9	66 3/4	16 3/4	27 17/32
6-22-S	30 1/4	63 1/4	15 3/4	9 x 13 1/4	56 1/4	9	71 1/2	16 3/4	27 17/32
4-23-S	31	52 41/44	16 1/8	8 7/16 x 12 5/8	46 5/8	9	60 5/8	16	28 1/4
5-23-S	31	57 33/44	16 1/8	8 7/16 x 12 5/8	51 3/8	9	65 3/8	16	28 1/4
6-23-S	31	62 17/44	16 1/8	8 7/16 x 12 5/8	56 3/32	9	70 3/32	16	28 1/4
4-25-S	32 15/16	55 5/8	16 1/4	9 x 13 1/4	47 7/8	9	63 3/8	17 1/2	30 1/8
5-25-S	32 15/16	60 1/4	16 1/4	9 x 13 1/4	52 1/2	9	68	17 1/2	30 1/8
6-25-S	32 15/16	65 3/8	16 1/4	9 x 13 1/4	57 5/8	9	73 1/16	17 1/2	30 1/8
4-28-S	36 15/16	57 5/8	16 3/8	9 5/8 x 18	49 1/4	10	66 5/8	18 5/8	34 1/16
5-28-S	36 15/16	62 5/8	16 3/8	9 5/8 x 18	54 1/4	10	71 5/8	18 5/8	34 1/16
6-28-S	36 15/16	67 5/8	16 3/8	9 5/8 x 18	59 1/2	10	76 7/8	18 5/8	34 1/16
4-31-S	40 3/16	59 3/4	16 1/4	9 5/8 x 18	51	10	68 5/8	19 1/16	36 7/8
5-31-S	40 3/8	65	16 1/4	9 5/8 x 18	56 1/4	10	73 7/8	19 1/16	36 7/8
6-31-S	40 3/8	70 3/8	16 1/4	9 5/8 x 18	61 5/8	10	79 1/4	19 1/16	36 7/8
4-34-S	45 3/16	61 1/2	17	9 5/8 x 18	52	11	71 1/4	19 13/16	39 27/32
5-34-S	45 3/16	67	17	9 5/8 x 18	57 1/2	11	76 3/4	19 13/16	39 27/32
6-34-S	45 3/16	72 5/8	17	9 5/8 x 18	63 1/8	11	82 3/8	19 13/16	39 27/32

Ideal Boilers are so designed that any casting, whether round or square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.

Water Boiler Measurements



Measurements are in Inches

	A	B	I	K	P	R	S	V	X
4-19-W	27	45 7/8	14 3/4	8 1/2 x 11 3/4	8	52 5/8	15 7/8	24 1/8	19 1/4
5-19-W	27	50 3/8	14 3/4	8 1/2 x 11 3/4	8	57 1/8	15 7/8	24 1/8	19 1/4
6-19-W	27	55	14 3/4	8 1/2 x 11 3/4	8	61 3/4	15 7/8	24 1/8	19 1/4
4-20-W	28 13/16	45 11/32	16	11 1/16 x 7 27/32	8	51 31/32	16	25 1/2	20 9/16
5-20-W	28 13/16	50 11/32	16	11 1/16 x 7 27/32	8	56 19/32	16	25 1/2	20 9/16
6-20-W	28 13/16	54 23/32	16	11 1/16 x 7 27/32	8	61 9/32	16	25 1/2	20 9/16
4-22-W	30 1/8	47 5/8	15 3/4	9 x 13 1/4	9	55 5/8	16 3/4	27 11/32	23
5-22-W	30 1/8	52	15 3/4	9 x 13 1/4	9	60	16 3/4	27 11/32	23
6-22-W	30 1/8	56 7/8	15 3/4	9 x 13 1/4	9	64 7/8	16 3/4	27 11/32	23
4-23-W	31 1/2	46 21/64	16 1/8	8 7/16 x 12 5/8	9	54 1/8	16	28 1/4	23 29/32
5-23-W	31 1/2	51 11/64	16 1/8	8 7/16 x 12 5/8	9	58 7/8	16	28 1/4	23 29/32
6-23-W	31 1/2	55 51/64	16 1/8	8 7/16 x 12 5/8	9	63 19/32	16	28 1/4	23 29/32
4-25-W	33 1/8	48 3/4	16 1/4	9 x 13 1/4	9	56 1/4	17 1/2	30 1/8	25 1/2
5-25-W	33 1/8	53 1/2	16 1/4	9 x 13 1/4	9	61	17 1/2	30 1/8	25 1/2
6-25-W	33 1/8	58 5/8	16 1/4	9 x 13 1/4	9	66 1/8	17 1/2	30 1/8	25 1/2
4-28-W	36 3/4	50 3/4	16 3/8	9 5/8 x 18	10	59 1/2	18 5/8	34 1/16	29 3/8
5-28-W	36 3/4	55 3/4	16 3/8	9 5/8 x 18	10	64 1/2	18 5/8	34 1/16	29 3/8
6-28-W	36 3/4	60 7/8	16 3/8	9 5/8 x 18	10	69 5/8	18 5/8	34 1/16	29 3/8
4-31-W	39 1/8	53 1/8	16 1/4	9 5/8 x 18	10	61 5/8	19 5/16	36 7/8	32 1/4
5-31-W	39 1/8	58 1/4	16 1/4	9 5/8 x 18	10	66 3/4	19 5/16	36 7/8	32 1/4
6-31-W	39 1/8	63 3/4	16 1/4	9 5/8 x 18	10	72 1/4	19 5/16	36 7/8	32 1/4
4-34-W	42	54 1/4	17	9 5/8 x 18	11	63 5/8	19 13/16	39 27/32	37
5-34-W	42	59 5/8	17	9 5/8 x 18	11	69	19 13/16	39 27/32	37
6-34-W	42	65 1/4	17	9 5/8 x 18	11	74 5/8	19 13/16	39 27/32	37

Ideal Boilers are so designed that any casting, whether round or square, may be taken through any door or opening which is not less than 2 feet 6 inches wide.

Fuel Basis for Ratings

The ratings of our Ideal Boilers are based on use of good grades of anthracite coal, since that fuel is more nearly uniform in heating effects. For the smaller sizes of IDEAL Boilers coal of regular "stove" or "range" size is in most cases the best to use; while in the larger boilers "egg" size will be found more suitable. Other kinds of fuel, preferably "caking" soft coals, may be used if due consideration is given to differences in calorific power, in space occupied by a given weight of the fuel, and in amount of attendance necessary.

Rating Conditions

CONDITIONS: The ratings of IDEAL Boilers are based on the quantity of steam delivered at the boiler outlet; hence, in addition to the direct radiation to be used in selecting boiler of right capacity, there must be added the load imposed by uncovered mains and risers, both flow and return, or any other load which may be attached. An uncovered Boiler is likewise an additional tax. For **STEAM BOILERS** it is assumed that a pressure of two pounds is maintained at the Boiler, and that the radiation is standing in quiet air at 70 degrees F. Under such conditions a square foot of heat-radiating surface will condense not more than 0.25 (¼) pound of steam per hour. For **WATER BOILERS** it is assumed that a temperature of 180 degrees F. is maintained at the Boiler with the radiation standing in quiet air at 70 degrees F.

Domestic Water Heating

METHODS COMPARED: When a pipe coil or cast-iron section is introduced into firepot of an IDEAL Boiler to heat water for domestic use, additional capacity should be provided—viz.: Based on temperature rise of 45 degrees F. per hour additional tax is imposed as follows:

STEAM BOILER—1½ sq. ft. direct radiation per gallon of water heated.

WATER BOILER—2½ sq. ft. direct radiation per gallon of water heated.

Due consideration being given to capacity of storage tank used.

This method is not recommended, because the demand for hot water for domestic use is independent of weather conditions. The heating power of coils varies with conditions of fire in the Boiler, being greatest in winter when firing is at maximum and least in mild weather when fire runs low. A separate IDEAL Water Heater best supplies this demand, burns little fuel, easily regulated and heated water is constant all summer when most needed, while a coil in Boiler would then be useless.

Guarantee and Coverings

These Boilers are guaranteed only to the extent of furnishing new castings for any found defective in manufacture. On account of the varying conditions surrounding their installation, we do not guarantee our Boilers otherwise.

Both on account of increased efficiency and greater economy, we recommend that all Boilers be thoroughly protected by a substantial covering of asbestos.

1151 August, 1913